

REMARKS

Pending Claims

Claims 1-5 have been examined. Claims 2 and 5 have been canceled without prejudice. Claim 1 has been amended. Support for the amendment is found, for example, on page 5, line 16 to page 6, line 27 of the present specification and in Figs. 2, 3, and 4. No new matter has been added. Claims 3 and 4 have been amended to make them depend from pending claims. No new matter has been added.

The pending claims are 1, 3, and 4.

Claim Rejection – 35 USC §103

(A) Claims 1-4 have been rejected under 35 USC §103(a) as being unpatentable over Maruyama et al. ("Maruyama"), US Patent No. 6,153,853, in view of Japan Laid-Open Publication No. 10-230,393 ("the '393 Japan publication"). Applicants respectfully traverse the rejection. A person of ordinary skill in the art would not have combined the references as suggested by the Examiner. Furthermore, even if the references were combined, the invention as set forth in the pending claims would not have been obvious from the cited prior art references.

To wit:

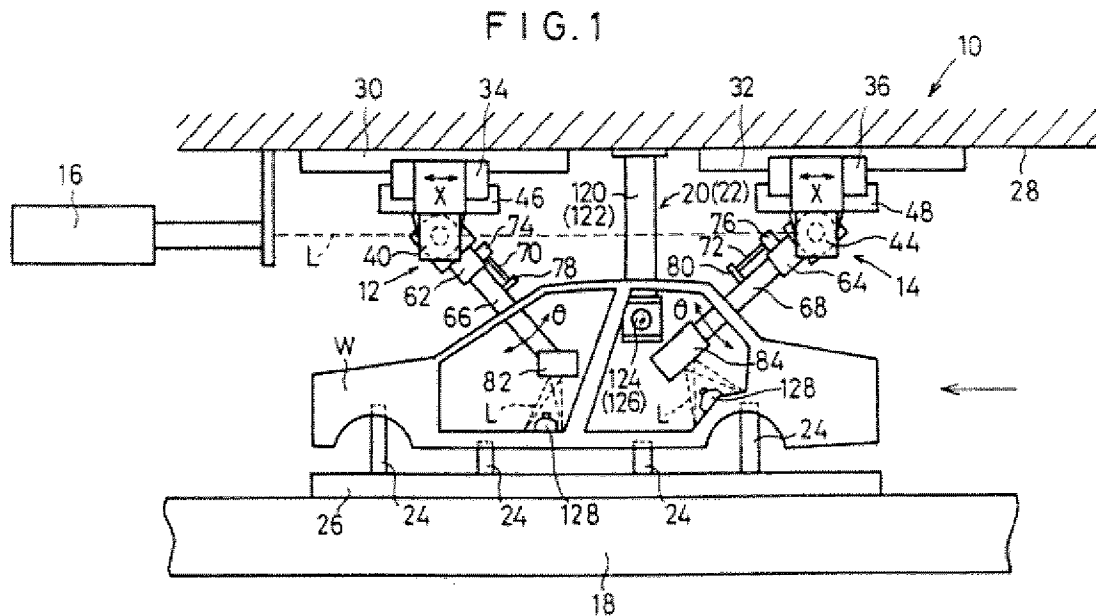
On page 2 and 3 of the Office Action, the Examiner states as follows:

Maruyama et al. discloses a laser beam machine with a processing scanner (element 82 or 84) that includes a [sic] angular pivot shaft (see figure 1). Japan Patent No. 10-230,393 teaches triaxial positioners (see paragraphs 7-11 and figures 1-3) with concentrated centers of rotation. It would have been obvious to adapt Maruyama et al. in view of Japan Patent No. 10-230,393 to precisely position the workpiece in three dimensions.

However, what Maruyama discloses is a laser beam welding apparatus, a description of which is provided in column 3, lines 5 to 18 in view of Figs. 1 and 2:

As shown in FIGS. 1 and 2, a laser beam welding apparatus 10 according to a first embodiment of the present invention generally comprises two welding robots 12, 14 installed in a welding station, a laser beam emitting device 16 for supplying a laser beam L to the welding robots 12, 14, a feed mechanism 18 for delivering a workpiece W, which is illustrated as an automobile body, to the welding station, and two position detectors 20, 22 positioned one on each side of the welding station for detecting the position of the workpiece W that has been delivered to the welding station. The workpiece W is carried on a delivery carriage 26 by a plurality of clamps 24 and delivered to the welding station by the delivery carriage 26.

Moreover, the Examiner alleges that scan heads 82 and 84 shown in Figs. 1 and 2 below correspond to the processing scanner as set for the present claims.



¹ The paragraph citation refers to the English translation of the '393 Japan publication.

(i) First, even if confronted with the two references, a person of ordinary skill in the art would have been at a loss as to what to combine. The jig 10 of the '393 Japan Publication is specifically designed to hold the flanges 83 and 84 in place so that an irregularly shaped short pipe can be manufactured. In contrast, Maruyama's laser beam welding apparatus 10 including scan heads 82 or 84 is an apparatus for welding an automobile body by laser. What component(s) would a person of ordinary skill in the art have picked from the '393 Japan Publication to incorporate it (them) into Maruyama's laser beam welding apparatus 10? Would the skilled person have

incorporated the pipe 88 somewhere in Maruyama's laser beam welding apparatus 10? The platform 12? If Jig 10 of the '393 Japan Publication is to be incorporated, where do one skilled in the art incorporate it in Maruyama's apparatus? The references themselves do not give any need, reason, suggestion, or teaching to combine any of the components. For at least this reason, a person of ordinary skill in the art would not have combined the references as suggested by the Examiner. To suggest otherwise is to exercise impermissible hindsight reconstruction by making the present specification a blue print for the reconstruction.

(ii) Second, even if a person of ordinary skill in the art would have been aware of the jig 10 of the '393 Japan Publication (the alleged "triaxial positioners"), the skilled person would not have adapted the jig 10 to Maruyama's laser beam welding apparatus 10 to position the workpiece because there would not have been any need, reason, suggestion, or teaching to do so. As seen from Figs. 1 and 2, what supports and carries the Maruyama's workpiece is clamps 24 and carriage 26. Maruyama states that "the workpiece W is carried on a delivery carriage 26 by a plurality of clamps 24 and delivered to the welding station by the delivery carriage 26." (Column 3, lines 16-18.) That is, the workpiece is clamped down and fixed to the carriage 24. (See also column 4, lines 64-66.) Maruyama does not require triaxial positioners to unnecessarily move the workpiece – the automobile body – in some complicated fashion. Maruyama requires that the workpiece be simply clamped down and fixed to the carriage.

Moreover, once the workpiece on the carriage is delivered to a welding station 26, the workpiece is further clamped down by clamping mechanisms 128 (see column 4, line 66 to column 5, line 10 and Fig. 5.) Then a positional error correction procedure

using CCD cameras are executed to compare the captured image to the reference image data to correct for any positional error. That is, the training data, which are data used to move the welder robots 12 and 14, are corrected for any positional error. By moving the welding robots 12 and 14 by the welding robot controller 146 based on the corrected training data, the positional errors are compensated. Maruyama concludes by stating "[s]ince the laser beam welding apparatus 10 has such a training data correcting capability, it is not necessary to position the workpiece W highly accurately with respect to the welding station, and hence the laser beam welding apparatus 10 may be implemented with relatively simple equipment." (See column 5, lines 50.) Because there is a positional corrective process via the welding robots 12 and 14, there is no need or reason for a complicated device such as triaxial positioners to unnecessarily move the workpiece. Therefore, for at least the reason above, a person of ordinary skill in the art would not have combined the references as suggested by the Examiner.

(b) Even if, arguendo, the references were combined, the invention as set forth in the pending claims would not have been obvious from the cited prior art references.

Claim 1 as amended recites as follows:

Claim 1 (currently amended): A laser beam machine comprising:

(a) a processing scanner, which comprises:

a beam-scanning mechanism, said beam-scanning mechanism including a Z-scan unit and an X-Y scan unit, said Z-scan unit including a focusing lens which focuses a laser beam and is movable in a direction parallel with a Z axis, and said X-Y scan unit including a pivotable scanning mirror for performing scanning with said scanning mirror pivotally rotating about an X axis parallel with said Z axis and about an Y axis perpendicular to said X axis; and a tilt mechanism for pivotally rotating said X-Y scan unit about said X axis; and

(b) two article position controllers for controlling in a coordinated manner the position of a mounted article to be processed in accordance with the direction of the laser beam from said processing scanner, said

article position controllers being disposed in the irradiation path of the laser beam from said X-Y scan unit which is positioned at a pivot end of said tilt mechanism, and

wherein a focal point of said laser beam is a processing spot, a transfer range of said focal point being changed by said tilt mechanism, and said article position controllers being disposed substantially symmetrically with respect to the center of the transfer range of said focal point.

Maruyama or the '393 Japan Publication individually or in combination does not disclose, teach, or suggest the features as set forth in (a), (b), or the wherein clause.

Dependent claims 3 and 4 are also not obvious from the cited references at least for the same reasons as claim 1.

(B) Claim 5 has been rejected under 35 USC §103(a) as being unpatentable over Maruyama et al. in view of Japan Patent No. 10-230,393 as applied to claim 4 above, and further in view of Karube et al. ("Karube") in WO 94/03302.

Claim 5 has been canceled without prejudice. Therefore, this rejection has been obviated for at least that reason. However, Applicants below further distinguishes the claimed invention from the cited prior art references.

With regard to Maruyama and the '393 Japan Publication, as stated previously, a person of ordinary skill in the art would not have combined them as suggested by the Examiner. Both of these references also do not disclose or teach the features of amended claim 1. Adding Karube, which is cited for a beam diameter correction lens 20 and a reflecting mirror 5, to Maruyama and the '393 Japan Publication would not have rendered the claimed invention obvious for at least the reasons stated for claim 1.

Summary

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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By: 

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